UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,110,390 B1
APPLICATION NO. : 09/294475
DATED : September 19, 2006
INVENTOR(S) : Kevin Gatesman et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Delete the title page and substitute therefore the attached title page consisting of the corrected illustrative figure and number of drawing sheets in patent.

Delete Drawing Sheets 1-6 and substitute therefore the attached Drawing Sheets 1-5. FIGS. 1-4 have been substituted with replacement FIGS. 1-4.

This certificate supersedes the Certificate of Correction issued August 14, 2012.

Signed and Sealed this
Fourth Day of September, 2012

David J. Kappos

David J. Kappos
Director of the United States Patent and Trademark Office

(12) **United States Patent**
Gatesman

(10) **Patent No.: US 7,110,390 B1**
(45) **Date of Patent: Sep. 19, 2006**

(54) **COMMUNICATION CONTROLLER FOR PROVIDING MULTIPLE ACCESS USING A SINGLE TELEPHONE LINE**

(75) Inventor: **Kevin Gatesman**, Fairfax, VA (US)

(73) Assignee: **MCI, Inc.**, Ashburn, VA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 546 days.

(21) Appl. No.: **09/294,475**

(22) Filed: **Apr. 20, 1999**

(51) **Int. Cl.**
H04L 12/66 (2006.01)
H04L 12/28 (2006.01)

(52) **U.S. Cl.** **370/352**; 370/401; 370/466

(58) **Field of Classification Search** 370/351–356, 370/400–402, 473–466; 379/88.17, 900, 379/215.01; 709/265
See application file for complete search history.

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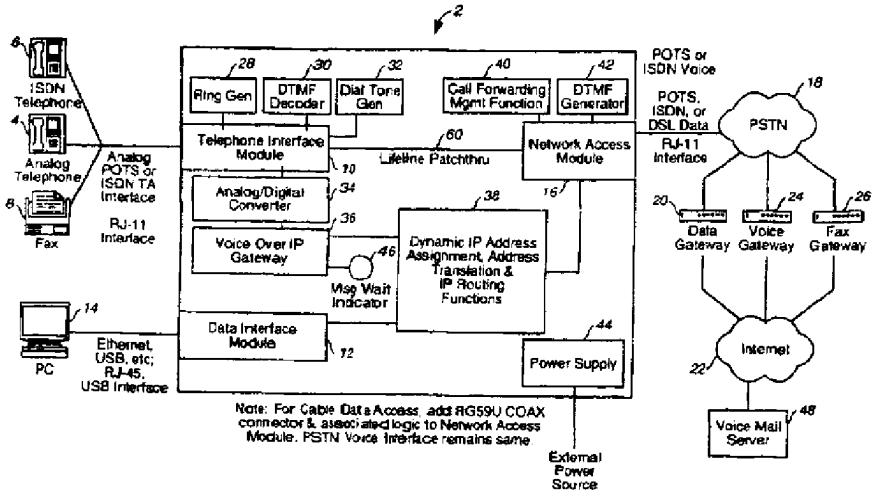
Primary Examiner Steven Nguyen

(57) **ABSTRACT**

Instead of having to subscribe to multiple telephone lines for multiple devices that a user has, a module of the present invention can connect each of the user's devices to an outside communications network using the same telephone line. Such multiple inside connections to the outside communication network using the same telephone line is achieved by provisioning within the invention module the appropriate telephone and computer interface units for the user's telephones and computers, and an appropriate network interface unit for connection to the telephone line that connects the invention module to the external communications network. The module of the instant invention is further provisioned with an IP routing submodule that communicatively connects the various interface units together by managing the addressing of the data that traverses between the outside network and the devices of the user, by routing the appropriate data packets to the appropriate devices by means of pseudo internal IP addresses assigned to the various devices of the user. Other components within the module convert those data packets that are a part of a voice signal into the appropriate analog signal for output to the telephone of the user. Conversely, such components convert any analog input from the user into a corresponding digital signal that is packetized and output to the external communications network.

29 Claims, 5 Drawing Sheets



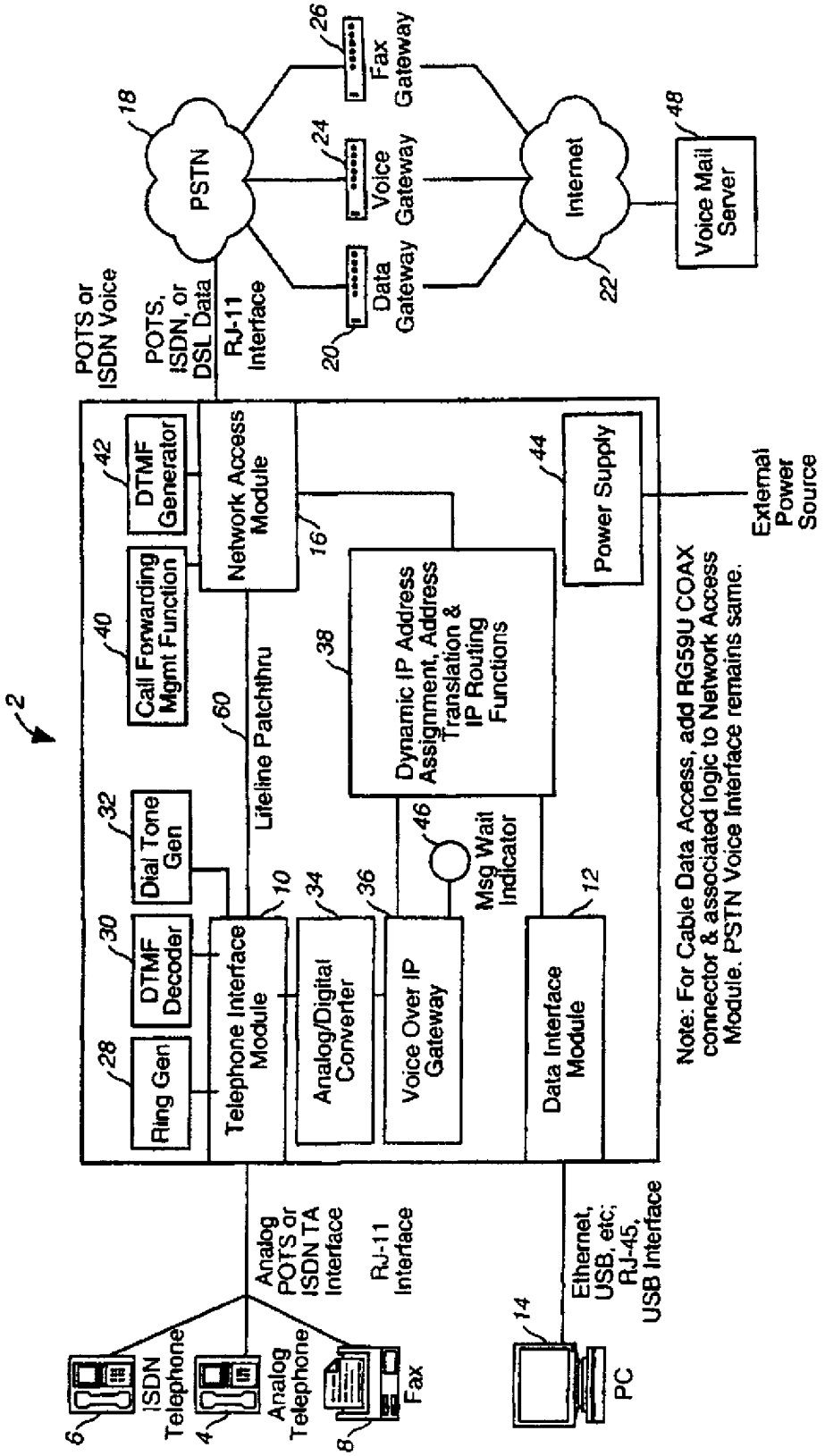

2
18
PSTN
26
Fax Gateway
24
Voice Gateway
20
Data Gateway
22
Internet
48
Voice Mail Server
POTS or ISDN Voice
POTS, ISDN, or DSL Data
RJ-11 Interface
Network Access Module
16
42
DTMF Generator
40
Call Forwarding Mgmt Function
60
Lifeline Patchthru
38
Dynamic IP Address Assignment, Address Translation & IP Routing Functions
44
Power Supply
External Power Source
32
Dial Tone Gen
30
DTMF Decoder
28
Ring Gen
10
Telephone Interface Module
34
Analog/Digital Converter
36
Voice Over IP Gateway
46
Msg Wait Indicator
12
Data Interface Module
Note: For Cable Data Access, add RG59U COAX connector & associated logic to Network Access Module. PSTN Voice Interface remains same.
Analog POTS or ISDN TA Interface
RJ-11 Interface
Ethernet, USB, etc; RJ-45, USB Interface
6
ISDN Telephone
4
Analog Telephone
8
Fax
14
PC

FIG. 1

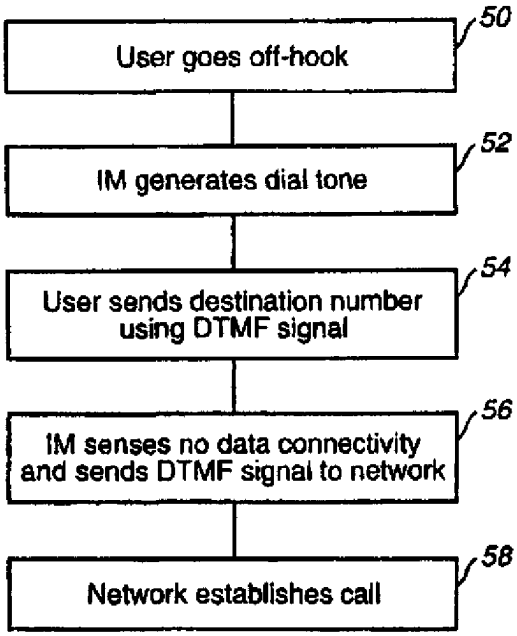

User goes off-hook
50
IM generates dial tone
52
User sends destination number using DTMF signal
54
IM senses no data connectivity and sends DTMF signal to network
56
Network establishes call
58

FIG. 2

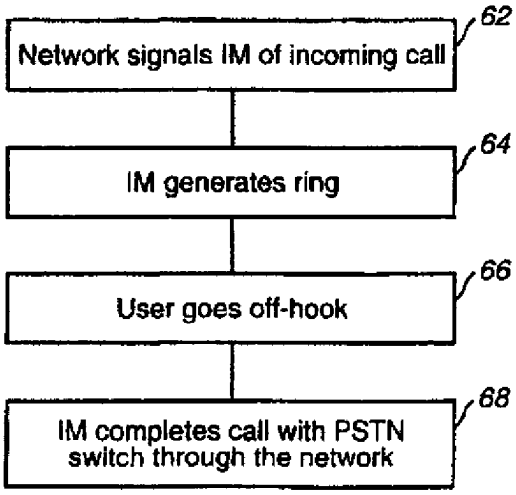

Network signals IM of incoming call
62
IM generates ring
64
User goes off-hook
66
IM completes call with PSTN switch through the network
68

FIG. 3

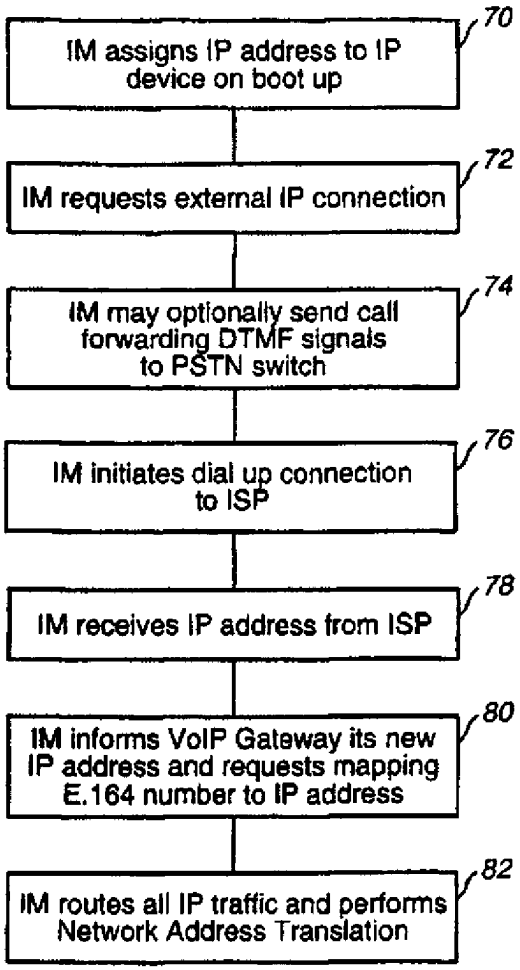

IM assigns IP address to IP device on boot up
70
IM requests external IP connection
72
IM may optionally send call forwarding DTMF signals to PSTN switch
74
IM initiates dial up connection to ISP
76
IM receives IP address from ISP
78
IM informs VoIP Gateway its new IP address and requests mapping E.164 number to IP address
80
IM routes all IP traffic and performs Network Address Translation
82

FIG. 4

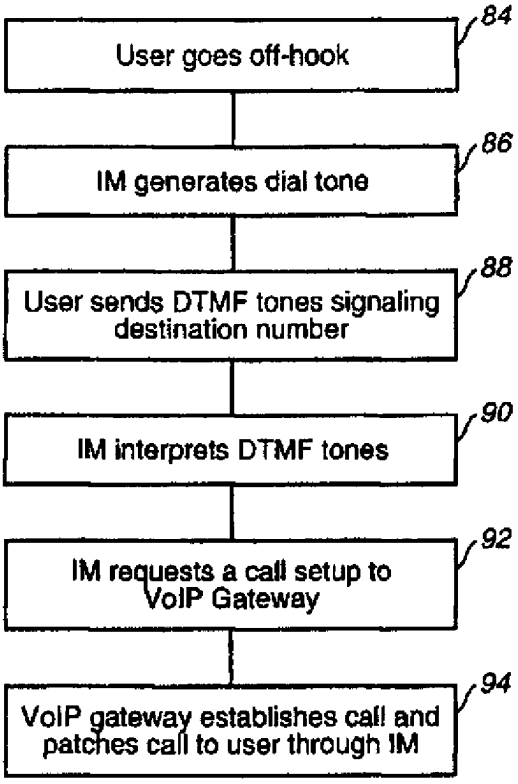

User goes off-hook
84
IM generates dial tone
86
User sends DTMF tones signaling destination number
88
IM interprets DTMF tones
90
IM requests a call setup to VoIP Gateway
92
VoIP gateway establishes call and patches call to user through IM
94

FIG. 5

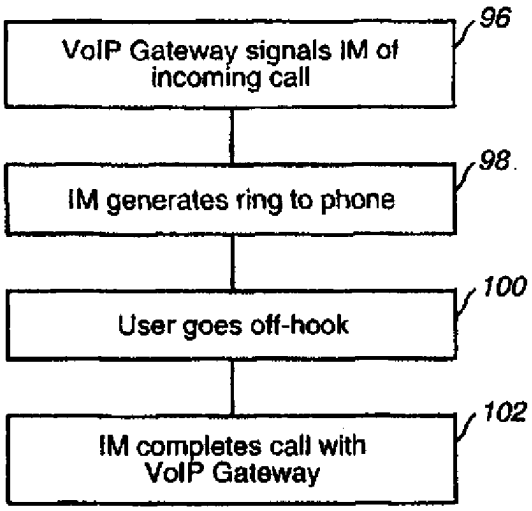

VoIP Gateway signals IM of incoming call
96
IM generates ring to phone
98
User goes off-hook
100
IM completes call with VoIP Gateway
102

FIG. 6

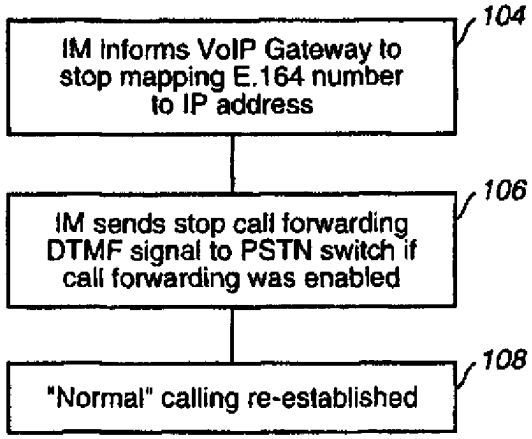

IM informs VoIP Gateway to stop mapping E.164 number to IP address
104
IM sends stop call forwarding DTMF signal to PSTN switch if call forwarding was enabled
106
"Normal" calling re-established
108

FIG. 7